# Tier II Data Validation Report Summary

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| Client: Chevron Environmental Management Company (EMC) Cincinnati | Laboratory: Lancaster Laboratories, Inc. |
| Project Name: Barrier Wall Monitoring GW Sampling | Sample Matrix: Groundwater |
| Project Number: 500-017-012 | Sample Start Date: December 21, 2009 |
| Date Validated: February 24, 2010 | Sample End Date: December 21, 2009 |
| Parameters Included: Volatile Organic Compounds (VOC) by Solid Waste-846 (SW-846) Method 8260B; Carbon Dioxide by SW-846 8000B; Methane by SW-846 Modified Method 8015B; Total and Dissolved Metals by SW-846 Method 6010B; Ferric Iron by SW-846 Modified Method 6010B; Chloride and Sulfate by Environmental Protection Agency (EPA) Method 300.0; Kjeldahl Nitrogen by EPA Method 351.2; Nitrate Nitrogen and Nitrite Nitrogen by EPA Method 353.2; Total Organic Carbon (TOC), Total Carbon (TC), and Total Inorganic Carbon by Method EPA 415.1, Alkalinity by Standard Method 20th Edition (SM20) 2320 B; Ferrous Iron by Modified Method SM20 3500 Fe B; Sulfide by Method SM20 4500 S2 D; and Ammonia Nitrogen by Modified Method SM20 4500NH3 B/C | |
| Laboratory Project ID: 1176228 | |
| Data Validator: Tim Gunn, CHMM | |

**DATA EVALUATION CRITERIA SUMMARY**

A Tier II Data Validation was performed by Trihydro Corporation's Chemical Data Evaluation Services group on the analytical data report package generated by Lancaster Laboratories evaluating samples from the Chevron EMC site located in Cincinnati, Ohio. For the purpose of data storage, location identification for the following samples has been changed to reflect QAPP requirements. The samples names and location identification are as follows; Packer, 122109 (Equipment Blank, 122109), Pump#1, 122109 (Equipment Blank 2), and Pump#2, 122109 (Equipment Blank 3).

Precision, accuracy, method compliance, and completeness of this data package were assessed during this data review. Precision was determined by evaluating the calculated relative percent difference (RPD) values of samples from laboratory duplicate pairs. Laboratory accuracy was established by reviewing the demonstrated percent recoveries of matrix spike (MS) and matrix spike duplicate (MSD) samples, and of laboratory control samples (LCS) and laboratory control sample duplicates (LCSD) to verify that none of the data were biased. Additionally, field accuracy was established by collecting field, equipment, and trip blank sample to monitor for possible ambient or cross contamination during sampling. Method compliance was established by reviewing holding times, detection limits, surrogate recoveries, method blanks, and the LCS and LCSD percent recoveries against method specific requirements. Completeness was evaluated by determining the overall ratio of the number of samples planned versus the number of samples with valid analyses. Determination of completeness included a review of the chain-of-custody, laboratory analytical methods, and any other necessary documents associated with this analytical data set.

Data were evaluated in general accordance with validation criteria set forth in the USEPA Contract Laboratory Program (CLP) National Functional Guidelines for Superfund Organic Methods Data Review, document number USEPA-540-R-08-01, June 2008 with additional reference to USEPA Contract Laboratory Program (CLP) National Functional Guidelines for Organic Data Review, document number EPA 540/R-99-008 of October 1999 and the USEPA CLP National Functional Guidelines for Inorganic Data Review, document number EPA 540R-04-004, October 2004.

## Tier II Data Validation Report Summary

### SAMPLE NUMBERS TABLE

| Client Sample ID | Laboratory Sample Number |
|---|---|
| Packer, 122109 (Equipment Blank 1) | 5871105 |
| Packer, Filtered, 122109 (Equipment Blank 1) | 5871106 |
| Pump#1, 122109 (Equipment Blank 2) | 5871107 |
| Pump#1, Filtered, 122109 (Equipment Blank 2) | 5871108 |
| Pump#2, 122109 (Equipment Blank 3) | 5871109 |
| Pump#2, Filtered, 122109 (Equipment Blank 3) | 5871110 |
| FB-1, 122109 | 5871111 |
| Trip Blank, 122109 | 5871112 |
| BSW-3D, 122109 | 5871113 |
| BSW-3D, Filtered, 122109 | 5871114 |
| BSW-3S, 122109 | 5871115 |
| BSW-3S, Filtered 122109 | 5871116 |
| MW-137I, 122109 | 5871117 |
| MW-137I, Filtered, 122109 | 5871118 |

The samples were analyzed for client-specified analytes. Chain-of-custody (COC) completeness is included in Section #3. The laboratory data were reviewed to evaluate compliance with the required methods and the quality of the reported data. A leading check mark (✓) indicates that the referenced data were deemed acceptable. A preceding crossed circle (⊗) signifies problems with the referenced data that may have warranted attaching qualifiers to the data.

- ✓ Data Completeness
- ✓ COC Documentation
- ⊗ Holding Times and Preservation
- ✓ Laboratory Blanks
- ✓ System Monitoring Compounds (i.e. Surrogates)
- ✓ Laboratory Control Samples/Laboratory Control Sample Duplicates (LCS/LCSD)
- ✓ Matrix Spike/Matrix Spike Duplicates (MS/MSD)
- ✓ Laboratory Duplicates
- ✓ Field Duplicates
- ⊗ Equipment blank and Trip Blank

**OVERALL DATA PACKAGE ASSESSMENT**

Based on a data validation review, the data are acceptable as delivered. Data qualified by the laboratory are discussed in Section #2.

The purpose of validating data and assigning qualifiers is to assist in proper data interpretation. Data which are not qualified meet the site data quality objectives. If values are assigned qualifiers other than an R, the data may be used for site evaluation, with the reasons for qualification being given consideration when interpreting sample concentrations. Data points which are assigned an R qualifier should not be used for any site evaluation purposes. Data were qualified with J data flags by the laboratory if the result was greater than or equal to the method detection limit (MDL) but less than the limit of quantitation (LOQ). Laboratory J flags were preserved in the data and included in the Data Qualification Summary table at the end of this report.

Data qualifiers used during this validation included:

J – Estimated concentration

U – Evaluated to be undetected at the reporting limit

**Data Completeness**

The analyses appeared to be performed as requested on the chain-of-custody records. The associated samples were received by the laboratory and appeared to be analyzed properly. No data points were rejected. The data completeness measure for this data package is 100% and is acceptable.

| VALIDATION CRITERIA CHECKLIST | |
|---|---|
| 1. Was the report free of any non-conformances related to the analytical data identified by the laboratory? | Yes |
| Comments: The laboratory did not note any non-conformances related to the analytical data. | |
| 2. Were data qualification flags or any other notes used by the laboratory? If yes, define. | Yes |
| Comments: The laboratory noted that the samples were filtered in the field for dissolved metals. The laboratory used the following data qualification flags with this data set.<br>J – Estimated value<br>(1) The result for one or both determinations was less than five times the limit of quantitation (LOQ).<br>(2) The unspiked result was more than four times the spike added.<br>*- Outside of specification | |
| 3. Were sample COC forms complete? | Yes |
| Comments: The COC form was complete from the field to the laboratory with the following exception. The Custody was maintained as evidenced by proper signatures, dates, and times of receipt. As stated above, for the purpose of data storage, location identification for the following samples has been changed to reflect QAPP requirements. The samples names and location identification are as follows; Packer, 122109 (Equipment Blank, 122109), Pump#1, 122109 (Equipment Blank 2), and Pump#2, 122109 (Equipment Blank 3). | |
| 4. Were detection limits in accordance with the QAPP, permit, or method? | Yes |
| Comments: The detection limits were found to be acceptable. Dilutions up to 20 times were applied to samples for chloride, sulfate, and ferrous iron analyses. The final usability of the data with respect to dilutions will be determined by the project manager. | |
| 5. Were the requested analytical methods in compliance with the QAPP, permit, or COC? | Yes |
| Comments: The requested analytical methods were in compliance with the COC and the attached analyte list, *Analytical Requests for Groundwater*. | |
| 6. Were samples received in good condition within method specified requirements? | Yes |
| Comments: The samples were received in good condition but below the recommended temperature range of 4°C +/- 2°C at 1.4° – 1.8° C. The cooler temperature that was below 2°C was judged as acceptable since the samples were not reported to be frozen upon receipt at the laboratory and the sample containers were reported to be intact. The custody seals were present and intact. | |
| 7. Were samples analyzed within method specified or technical holding times? | No |
| Comments: The samples were extracted or analyzed within method specified holding times with the following exception.<br>**The ferrous iron analysis was performed past the immediate recommended analysis time. The modified Method SM20 3500 Fe B states that holding time is 24 hours but the procedure can also be used in the laboratory if it is understood that normal sample exposure to air during shipment may result in precipitation of iron. As a result, the data were accepted with qualification of J for detections.** | |
| 8. Were reported units appropriate for the associated sample matrix/matrices and method(s) of analyses? | Yes |
| Comments: Sample results were reported in µg/L or mg/L, which are appropriate units for the requested analyses and the water matrix. | |
| 9. Do the laboratory reports include all constituents requested to be reported? | Yes |
| Comments: The laboratory report included the requested constituents listed on the attached list, *Analytical Requests for Groundwater*. | |

| VALIDATION CRITERIA CHECKLIST | |
|---|---|
| 10. Was there indication from the laboratory that the initial or continuing calibration verification results were within acceptable limits? | N/A |
| Comments: Initial and continuing calibration data were not included as part of this data set; however, these data are assumed to be acceptable as the laboratory did not note that any calibration verification results were outside acceptable limits. | |
| 11. Was the total number of method blank samples prepared equal to at least 5% of the total number of samples, or analyzed as required by the method? | Yes |
| Comments: The total number of method blanks prepared was greater than 5% of the total number of samples. | |
| 12. Were method blank samples free of analyte contamination? | No |
| Comments: There were no detections of the requested analytes reported in the method blank samples with the following exception. For TC batch 09365049501A, the blank result was between the MDL and the RL at 0.56 mg/L. Since sample results for this data set were greater than 10 times the method blank detection, no qualification of data were required as there was no evidence of cross contamination. | |
| 13. Was the total number of matrix spike samples prepared equal to at least 5% of the total number of samples, or analyzed as required by the method? | Yes |
| Comments: The total number of matrix spike samples prepared was greater than 5% of the total number of samples.<br>Matrix spikes were prepared for VOCs batch T093641AA, methane batch 093570018A, nitrite nitrogen batch 09356105101A and nitrate nitrogen batch 10006106102A from sample BSW-3D, 122109. The remaining matrix spikes were prepared from samples not associated with this sampling event. | |
| 14. Were MS/MSD percent recoveries and MS/MSD RPD values within data validation or laboratory quality control (QC) limits? | Yes |
| Comments: The project specific MS/MSD recoveries were within laboratory-specified limits or were not applicable since the result was greater than four times the spiked concentration.<br>The MS and MSD spike recoveries and RPD values for non-project samples were considered but matrix similarity to project samples could not be guaranteed. | |
| 15. Was the total number of LCSs analyzed equal to at least 5% of the total number of samples, or analyzed as required by the method? | Yes |
| Comments: Laboratory control samples were prepared on at least a 5% basis for the total number of samples. | |
| 16. Were LCS/LCSD percent recoveries and LCS/LCSD RPD values within laboratory QC limits? | Yes |
| Comments: The LCS/LCSD percent recoveries and LCS/LCSD RPD values were within laboratory QC limits. | |
| 17. Were surrogate recoveries within laboratory control limits? | Yes |
| Comments: Surrogate recoveries were within laboratory control limits. | |
| 18. Was the number of equipment, trip, or field blanks collected equal to at least 10% of the total number of samples, or as required by the project guidelines, QAPP, SAP, or permit? | Yes |
| Comments: There was one trip blank (Trip Blank, 122109) one field blank (FB-1, 122109), and three equipment blanks (Equipment Blank, 122109, Equipment Blank 2, 122109, and Equipment Blank 3, 122109) collected with the samples of this data set, which is greater than 10% the total number of samples. | |
| 19. Were the trip blank, field blank, and/or equipment blank samples free of analyte contamination? | No |
| Comments: There were no detections of the requested analytes in the blank samples with the following exception. In Equipment Blank, 122109 (Packer, 122109), ethylbenzene was detected between the MDL and RL at 3 µg/L and xylene (total) was detected at 17 µg/L. For ethylbenzene, all associated sample results were non-detect and do not require qualification**. For xylene (total) detected sample results in samples BSW-3D and BSW-3S were qualified as U since they were both less than the reported equipment blank detection and less than the reporting limit.** | |

| VALIDATION CRITERIA CHECKLIST | |
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| 20. Were the field duplicates collected equal to at least 10% of the total number of samples, or as required by the project guidelines, QAPP, SAP, or permit? | No |
| Comments: There were no field duplicates associated with this data set. | |
| 21. Were field duplicate RPD values within data validation QC limits (soil 0-50%, water 0-30%, or air 0-25%)? | N/A |
| Comments: There were no field duplicates associated with this data set. | |
| 22. Were laboratory duplicate RPD values within laboratory-specified limits? | Yes |
| Comments: Laboratory duplicates were prepared for the following analyses including metals, nitrite nitrogen, TC, TOC, kjeldahl nitrogen, chloride, sulfate, nitrate nitrogen, ferrous iron, ammonia nitrogen, sulfide, and alkalinity. Laboratory duplicates were prepared for nitrate nitrogen batch 10006106102A and for nitrite nitrogen batch 09356105101A from sample BSW-3D, 122109. The remaining laboratory duplicates were prepared from samples not associated with this data set. | |
| The project specific laboratory duplicate RPD values were within the data validation QC limits or were qualified by the laboratory with (1) indicating that the result for one or both determinations was less than five times the LOQ with the following exception. | |

**DATA QUALIFICATION SUMMARY**

| Analyte | Field Sample ID | Lab Sample ID | Result | Units | Reviewer Qualifier | Reviewer Qualifier Reason |
|---|---|---|---|---|---|---|
| CO2 by Headspace | BSW-3D,122109 | 5871113 | 7200 | ug/L | J | Flagged by the Lab: Result between MDL and RL. |
| CO2 by Headspace | MW-137I,122109 | 5871117 | 11000 | ug/L | J | Flagged by the Lab: Result between MDL and RL. |
| Ethyl-benzene | Packer,122109 | 5871105 | 3 | ug/L | J | Flagged by the Lab: Result between MDL and RL. |
| Iron, Ferrous | BSW-3D,122109 | 5871113 | 0.27 | mg/L | J | Sample was extracted outside of the acceptable holding time. |
| Iron, Ferrous | MW-137I,122109 | 5871117 | 0.038 | mg/L | J | Sample was extracted outside of the acceptable holding time. |
| Iron, Total | MW-137I,122109 | 5871117 | 0.0602 | mg/L | J | Flagged by the Lab: Result between MDL and RL. |
| Nitrogen, Ammonia | BSW-3D,122109 | 5871113 | 0.21 | mg/L | J | Flagged by the Lab: Result between MDL and RL. |
| Toluene | MW-137I,122109 | 5871117 | 0.7 | ug/L | J | Flagged by the Lab: Result between MDL and RL. |
| Xylenes, Total | BSW-3D,122109 | 5871113 | 1 | ug/L | U | Equipment blank detection |
| Xylenes, Total | BSW-3S,122109 | 5871115 | 3 | ug/L | U | Equipment blank detection |